

RECORDING SUNSHINE¹

SO far as I have seen there is in use at present but one form of apparatus which effects an automatic registration of the duration and the times of sunshine, and that is the instrument of Campbell, in which a sphere of glass is so disposed as to burn a piece of wood or paper by the concentration of his rays when the sun may chance to shine. During the past few years I have devoted some attention to this matter and devised a number of appliances having the same object for their end but differing materially both in their construction and in the manner of their use from the apparatus I have named.

One of these, with your permission, I will now describe.

It is an arrangement which places a lead pencil on a sheet of paper and writes down therewith when and for how long the sunshine lasts.

It consists essentially of a differential thermometer with a long horizontal stem, in which latter is contained throughout the greater portion of its length some fluid intended to operate by its weight. This thermometer is attached to a scale beam or some equivalent device which also carries the pencil by means of which the record shall be made.

The whole is so arranged that in its normal state it rests gently—upon that side to which the pencil is *not* attached—on an embankment provided for that end.

Close beneath the pencil point a disk of metal rotated at the proper speed carries a paper dial whereon marks and figures are engraved corresponding with the hours at which the sun may shine.

When using this instrument I have it inclosed within a box which permits one bulb only of the thermometer—that most distant from the clock—to be affected by the radiance of the sun, which when it shines expands the air contained therein, forces the fluid along the tube and by altering the equilibrium of the beam brings some portion of its weight to bear upon the pencil point, and so the record is commenced.

When the sun becomes obscured, the air expanded by his rays contracts, the fluid in the tube returns, the normal equilibrium is restored, and the pencil ceases to produce its mark.

In the instance of the instrument I use the stem of the thermometer is 18 inches long and the eighth of an inch or thereabouts in bore.

Mercury in consideration of its weight is the fluid I employ, and in conjunction with it some sulphuric acid is inclosed, because of the mobility which is thereby gained. I am aware that in these circumstances mercuric sulphate is very slowly formed, but after two years' lapse of time no inconvenience has been caused thereby and the mobility of the mercury remains.

The bulbs of the thermometer are 2 inches in diameter or thereabouts, and that they may be more rapidly affected the glass thereof is thin. Both are blacked, and the one intended to receive the radiance of the sun projects above the box in which the apparatus is contained into a dome of glass.

NOTES

W. HEPWORTH DIXON died very suddenly early on Saturday morning. He was best known to us as a brilliant writer and speaker, and but comparatively few knew how profoundly, and with what patient determination he would sift the truth, alike of even the most well attested, as of the most apparently trivial fact, before making use of it in his work. Only those within the circle of his more intimate friends were aware how well he followed and how easily he grasped the progress of scientific thought. In this circle were several with whom and about whose labours he delighted to converse, and none could listen

¹ Paper read at the Literary and Philosophical Society of Manchester by David Winstanley, F.R.A.S., November 18, 1879.

without benefiting by the practical views his vigorous intellect suggested, the more so as they were possibly induced by quite other claims of thought. These columns have called attention to the ethnological value of his researches in America. His travels, especially those in the Far West, in the wilder parts of Russia, in the Holy Land, and in Cyprus, attended at times with personal risk, are full of suggestive interest to the scientific mind, and we may shortly to call attention to some of the salient facts connected with natural science which they contain. In his early days he studied astronomy and kindred subjects, and it almost seemed at one period of his life that his bent would have led him more deeply into these researches. That this early inclination never forsook him, even those who knew him least, may gather from his attendance at the meetings of the British Association, his unremitting labours as chairman of the Palestine Exploration Fund, and his presence at numerous anniversary meetings of our learned societies. His surviving son, Harold, is already known as a teacher of natural science at Oxford University.

THE death, on December 18, is announced of Prof. Franz Boll, who has filled the Chair of Physiology and Comparative Anatomy in the Roman University; he was only thirty years of age. Born at New Brandenburg in February, 1849, he studied at Berlin and took his Doctor's degree in medicine and surgery in 1869. When little more than twenty years old, he became assistant to Dubois-Reymond in his physiological laboratory at Berlin. Having been obliged on account of his health to seek the warmer climate of Italy, he was in 1873 offered an appointment in the Roman University, and in 1877 was, by the unanimous decision of the Commission of Examiners, elected to the chair he has since held. His researches regarding the arterial circulation of the retina are recognised as a most valuable contribution to physiological science.

GENERAL surprise is naturally expressed that Dr. William Farr has not been appointed to succeed Major Graham as Registrar-General. Dr. Farr's qualifications for the post are known to all the world; but it has been conferred upon Sir Brydges Henniker, Bart., for what reason we have failed to discover. It must be regarded as an almost national misfortune, though it will surprise no one, that Dr. Farr has resigned his post as head of the statistical department.

THE *Hannoversche Courier* announces that Leibnitz's long-lost calculating machine has been recovered. Leibnitz invented and constructed this machine in 1672, during his stay in Paris. It can add, subtract, divide, and multiply, and was the wonder of the time. This machine became the property of the Hanover public library, but long ago disappeared from among its treasures. All that was known about its disappearance was that it had once been sent to an instrument maker at Göttingen to be repaired. It has now turned up again in the Göttingen library, and through the efforts of Dr. Bodemann, the librarian of the Hanover public library, has again come into the possession of the institution.

It is only about a year since we gave some account (*NATURE*, vol. xviii. p. 361) of the railway bridge which spans the Firth of Tay at Dundee, and on Sunday it was the scene of one of the most terrible railway accidents on record. With the details of this sad occurrence our readers are no doubt familiar; for accurate information as to the prime cause we must await the searching inquiry which will no doubt be instituted. The structure appears to have been subjected to the most rigid tests before being opened to traffic, but we fear there must have been more than one screw loose somewhere. Upwards of 3,000 feet of the high girders are reported to have been swept away. One conjecture is that the train had got well upon the girders when a

gust of greater strength had caught the structure. There would thus be, in addition to the ordinary vibration of the train, an enormous lateral pressure from the wind. The carriages of the train would also, of course, feel the full force of the blast, and once the weakest part yielded the whole would go with a sudden crash. In a letter to the *Glasgow Herald*, Prof. Grant states that the storm of Sunday was the most violent in Scotland for thirty years, and that the rate of the wind about 7 P.M. was upwards of seventy miles per hour, equal to a pressure of forty-two pounds per square foot. No doubt there were frequent sudden gusts reaching a rate of ninety miles per hour. A Commission of Investigation has already been appointed.

THE *Times* correspondent describes a visit he made to inspect Mr. Edison's new electric light at Menlo Park. Two of the lights had been burning continuously for ten days without injury to the baked cardboard horseshoe in the little glass globe which furnishes the light. Cardboard, he states, seems sufficiently durable, successfully resisting quite rough usage, such as dropping, shaking, turning the current on and off thousands of times, and raising the intensity of light to that of 400 candles. All the arrangements are simple. Mr. Edison will put about 800 lights at Menlo Park, while the inventions immediately go into practical operation in New York city. The globe containing the horseshoe is exhausted to one-millionth of an atmosphere by the Sprengel pump, measured by the M'Leod gauge. By successfully dividing the electric current Mr. Edison gets individual lamps of 16-candle power, each lamp having 100 ohms resistance. Light is turned on or off, and the current regulated with the same ease as gas is, while the current can be transmitted on wire as small as No. 36. The central regulator contains an even current, while the meters accurately measure the supply furnished to each consumer. Mr. Edison finds that the best generators are of five to seven horse power, each one-horse power maintaining eight lamps. Each lamp costs about one shilling to manufacture, while a supply equivalent to 10,000 feet of gas can be produced for tenpence or less. Mr. Edison calculates the cost of furnishing light thus:—the consumption of 3 lb. of coal in a steam engine will maintain eight to ten lamps one hour. Mr. Edison's system also furnishes electric power for small industries, such as running sewing machines. Mr. Edison's light is bright, clear, mellow, regular, free from flickering or pulsations, while the observer gets more satisfaction from it than from gas. Mr. Edison lights at Menlo Park, dwellings, offices, desks, street-lamps, also laboratory and workshop, making it available for every lighting purpose for which gas is used.

PROFESSORS C. A. F. PETERS (director of Kiel Observatory) and Albert von Kölliker (Würzburg) have been decorated by the King of Bavaria with the Maximilian Order for Art and Science.

THE death is announced of Dr. Alexander Sadebeck, of Kiel, professor of mineralogy and geology at Kiel University, on December 9, 1879, at the early age of thirty-six years.

THE Emperor of Austria has presented the Austrian Gold Medal for Arts and Sciences to Herr Wilhelm Hoffmann, of Dresden, in recognition of his merits in advancing the art of photography.

ON January 2, 1882, the University of Würzburg will celebrate the 300th anniversary of its foundation. The Bavarian Government had intended to set aside a sum of 2,000*l.* to defray the expenses of the celebration. The Finance Committee of the Bavarian House of Deputies have, however, declined to allow the sum in question.

THE two first parts of an interesting work, "*Bibliotheca Belgica: Bibliographie générale des Pays Bas*," have just been

published. The editor is M. Ferd. van der Haeghen, librarian of Ghent University. The work will contain (1) the description of all works printed in the Netherlands during the fifteenth and sixteenth centuries, as well as of the principal ones printed between 1600 and 1879; (2) a description of all works whose authors are born Netherlanders, as well as of all works printed abroad which refer to the Netherlands; (3) a list of all the works printed by Netherlanders who settled abroad.

A HIGHLY interesting discovery has recently been made on the Russian peninsula of Kertch. The director of the Kertch Museum discovered a tomb dating from the third century B.C., and from the reign of Persidas II., King of the Bosphorus. The tomb is situated on the road from Temruk and near the Sennaja Station. In it were found (1) a thick gold necklace, with a lion's head at each end; (2) a gold crown of about one inch in breadth, the exterior part being formed of intertwined rings, and ornamented with fine stones; (3) several pairs of gold ear-rings; (4) two gold chains, of which one is ornamented with figures; (5) two gold bracelets; (6) a round gold brooch, and a gold pin representing Venus and Cupid; (7) four gold leaves; (8) a pearl necklace, some amulets, and three small gold rings; (9) a phial, an urn, a vase, a spoon, &c.—all these of silver.

THE opening meeting of the Epping Forest and County of Essex Naturalists' Field Club will be held on Saturday evening, January 10, at the rooms of the Buckhurst Hill Art Classes, 3, St. John's Terrace, at seven o'clock. The objects of the club, as set forth in the proposed rules, are as follows:—"The investigation of the natural history, geology, and archæology of the County of Essex (special attention being given to the fauna, flora, geology, and antiquities of Epping Forest), the publication of the results of such investigations, the formation of a library of works of local interest and other publications, and the dissemination amongst its members of information on natural science and antiquities." Excursions, under skilful direction, to various localities of interest to the naturalist and antiquary, will also be a main object of the Club. The Club will strongly discourage the practice of removing rare plants from the localities where they are to be found or of which they are characteristic, and of risking the extermination of rare birds and other animals by wanton persecution; it will also endeavour to use its influence with landowners and others for the protection of the same, and to dispel the prejudices which are leading to their destruction. In like manner the club will endeavour to cultivate a fuller knowledge of local antiquities, historical, popular, and idiomatic, and to promote a taste for carefully preserving the monuments of the past from wanton injury. Considering the fine field offered to the biologist in Epping Forest and the surrounding country, it is certainly a matter of surprise that a society similar to that now in process of formation was not long since founded. We trust the club will meet ample support.

THE latest news from the St. Gothard Tunnel states that the thickness of the soft strata recently encountered was only ten metres, and that the boring machines are again at work on solid and firm rock.

AN earthquake is reported from Agram. It occurred during the night of December 8, 1879, and lasted three seconds. Another phenomenon of the same nature was observed at Seisenberg (Carniola) on December 4, at 6.45 A.M., lasting two seconds. The direction of the shock was from north to south. Ten minutes later a second shock was felt. The intensity of the shocks was alarming. A smart shock was felt at Geneva on December 30, at 12.15 P.M. Several shocks were felt on December 26, at Lyons, where the winter has been exceptionally severe.

THE *Times* correspondent describes an eruption of Vesuvius on the night of December 18, 1879. The mountain has been in

an uneasy state for several years, and slight eruptions have constantly taken place; but the climax seemed to have been arrived at on the 17th, when Vesuvius changed its mantle of snow for one of fire. As the wind blew furiously from the north-east, the lava descended in the direction of Portici, covering a large portion of the cone and presenting a magnificent spectacle. On the 18th there was less disturbance; but even in its state of greatest activity the mountain made none of those awful efforts which form a grand eruption. There were some local shocks, and a heavy breathing from the furnace, but there was no tremendous explosion. The cup was full, and it flowed over. This flowing over, however, if continued to great excess, may produce far greater disasters than a roaring discharge which finishes the whole business. Prof. Palmieri's reports of Mount Vesuvius state that the present modest eruption has lasted since 1875. It commenced at the bottom of the vast and deep crater left after the eruption of 1872, and was therefore only visible to those who ascended to the summit of the mountain. But now this crater is filled up by the new lava which flowed at successive periods, and therefore the fresh streams which issue from the eruptive cone flow down the external parts of the mountain, generally on the side towards Naples. The new eruptive cone has gradually increased in height until it now protrudes about fifty feet above the edge of the old crater.

WRITING to the *Western Daily Press* under the date of December 22, 1879, Prof. Silvanus Thompson says:—I had the opportunity about half-past ten this morning of witnessing from Clifton Down a phenomenon which enjoys the repute of being very rare. The entire gorge of the Avon was filled with mist, so that the river in the bottom and the Leigh Woods opposite were quite obscured. Standing on the western extremity of the Observatory Hill, I observed a dim gigantic figure apparently standing out through the mist upon one of the lower slopes of Clifton Down, where it runs down in undulating ridges from the promenade towards the river. A moment's glance sufficed to show me that it was my own shadow on the mist, and as I waved my arms about the gaunt spectre followed every movement. A gentleman who stood beside me likewise saw his spectre, but not mine, as we ascertained by the movements executed; nor could I see his, unless we stood so close together that the spectres seemed combined into one. The analogy presented by these spectres with the famous *Spectre of the Broken*, seen by travellers in the level rays of the morning sun from the summit of that celebrated mountain, and described by Sir David Brewster in his "Letters on Natural Magic," is very striking.

A PRIZE of 200*l.* has been offered by the Rev. E. Wyatt Edgell, through the Sanitary Institute of Great Britain, for the best essay that may be sent in by August 1 next, on "The Cause of Hereditary Tendencies in Health and Disease." The subject is of first importance in its bearings not only on personal but on natural health, and the Council of the Institute expects to receive many valuable contributions in competition. It only regrets that the generous donor, who for a long time has filled the office of Honorary Treasurer of the Institute, is obliged to resign office owing to a state of impaired health, which demands for a time residence abroad. The Chairman of Council of the Institute, Dr. Benjamin W. Richardson, F.R.S., and Dr. W. Farr, F.R.S., are appointed adjudicators of the prize.

PROF. F. W. HUTTON, of Dunedin, New Zealand, has been appointed to fill the new Chair of Biology in the Canterbury College at Christchurch. In consequence of this move the Chair of Natural Science in the Otago University is vacant. We have not heard what steps are being taken to fill it.

A REMARKABLE anthropological discovery has recently been made at Sypniewo, near Marienwerder (Prussia), by Herr Wilckens. In a bronze cauldron which was imbedded in the

ground several feet deep, were found calcined human bones (apparently both male and female), a golden hoop, an open necklace with hook and eye, two square sticks of greenish glass with marks on them, similar to the eyes of dice, twenty button-like ball segments without holes, four bronze plates, and fragments of some metal implements evidently burnt with the bodies. The articles seem to be of old Etruscan or Phœnician workmanship, and are now in the hands of the Historical Society of Marienwerder.

"WATER ANALYSIS," by Prof. Frankland, a long-promised contribution to an important question, will be published during January, by Mr. Van Voorst.

IN reporting the reception of Prof. Nordenskjöld and the staff of the *Vega* at Nagasaki, the correspondent of the *North China Herald* notes that there was not a single case of scurvy during the whole voyage. This, he learns, was owing to the free use of a curious little berry that springs out of the eternal ice and snow during the short summer; it bears profusely, and has a taste like the raspberry, but more acid. The fruit is dried, and then mixed with the milk of the reindeer, and it can be carried in a frozen state for thousands of miles. There was also used a curious kind of food made from the whale's hide, which is pickled and eaten freely during the winter.

THE additions to the Zoological Society's Gardens during the past week include a Yellow Conure (*Conurus solstitialis*) from Guiana, received in exchange; a Vulpine Phalanger (*Phalangista vulpina*), a Geoffroy's Dove (*Peristera geoffroyi*), bred in the Gardens.

GEOGRAPHICAL NOTES

THE eminent Russo-German traveller, Dr. Wilhelm Junker, well known by his successful tours in the Nile districts, left Cairo for Chartum on December 1. He travels *via* Suez and Suakin, and hopes during the present winter to reach the Upper Nile districts beyond Chartum. This time the Monbottu land will form the basis of his operations, and he intends to penetrate into the interior in the direction of the Congo or the Schari rivers.

DR. GERHARD ROHLFS has arrived at Rome on his return from North Africa.

THE expedition charged with the investigation of the question whether it is possible to conduct the waters of the Amu Daria into the Caspian Sea has started from St. Petersburg. General A. J. Gluchowski is commander of the Expedition, and M. Holmstrom acts as chief engineer. MM. Bole, Svichtchoff, and Masimovich are assistant engineers. Prince Gedroitz takes part in the expedition in the capacity of geologist. These gentlemen will be joined by Capt. Roop, from Turkestan, and by Engineer Hellmann, from the Caucasus. The company will first proceed to the delta of the Amu Daria, and then begin the investigation of the river's course and of the surrounding territory, with regard to elevation, geology, &c., &c. It is considered that two or three years will be necessary for collecting the materials to finally decide the question.

PROF. BASTIAN has arrived at Batavia. He has made important ethnological and anthropological researches in Assam, and has also brought together a valuable collection of illustrative specimens. He then continued his studies in the Padang Islands, and will now do the same on the island of Java.

THE Geographical Society of Hamburg has elected the well-known author of numerous descriptions of travels, cities, and countries, Herr Ernst von Hesse Wartegg, as a corresponding member.

THE Archbishop of Algiers has received from Zanzibar favourable reports of the eighteen missionaries who left Algeria last June and had reached Ugogo, as also of the missionaries sent out last year for Tanganyika. The latter had lost their superior, Père Pascal, but had arrived at Ujiji and had been well received there by the English mission and the Arab chiefs. They had explored Urundi, a rich region, which they depict in altogether different colours from Stanley, and by invitation of